

55. Red landscapes in the movie "The Martian", or how to get rid of the blue sky in the Martian pictures.

8-10 minutes

I noticed that the technology for making "Martian" shots at NASA and in the movie "The Martian" is the same. This is the conclusion I made the day before yesterday when I finally watched Ridley Scott's The Martian (2015). The movie turned out to be extremely boring. I did not even imagine that it was possible to shoot such a completely illiterate movie from the point of view of logic. Plastic film and scotch tape save you from temperatures of -120 degrees, a hole in a glove is equivalent to the thrust of a booster, etc. It seems that the film was made for elementary school children or for teenagers with Down syndrome. It's good that I looked at a speed of 2x, otherwise I would not have resisted. But that is not the question.

I was interested in how the colors of the "Martian" landscapes were obtained.



This is what the Martian landscape looks like in the movie.

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It was easy to find out that the shooting of the "Martian" landscapes took place in Jordan, in the Wadi Rum desert.



Working moment of filming "The Martian" in the Wadi Rum Desert.

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A still from the movie "The Martian".

A still from the movie "The Martian".

In Jordan, in this small state, at least [14 films](#) - the first was "Lawrence of Arabia (1962), the last was" Transformers. Revenge of the Fallen (2009) and Star Wars. Rogue 1 "(2016).

The exotic landscapes of the Wadi Rum Desert, similar to the Martian ones, attracted not only the film crew of the movie "The Martian" (2015). A little earlier, the films "Mission to Mars" (2000) and "Last Days on Mars" (2013) were filmed there.

You can watch a trip to this desert.

Марс на Земле: Пустыня...



For the film "The Martian", some of the scenery, imitating the Jordanian desert and, accordingly, a kind of Martian landscapes, were built in [studio pavilion](#) . The main vendor (i.e. the company that developed its own products and technologies) was the MPC studio. She created the tools to transform the terrestrial landscape into a Martian one. In the pavilion there was a green chroma key in the background.



The chromakey on the computer was replaced by a grayish-yellow sky.



Mountains were added to the background.



And the whole image was taken away in a brownish tone.



The landscape of Jordan was good in everything, only the sky in the desert was too blue, saturated in color.



Working moment of filming the film "The Martian".

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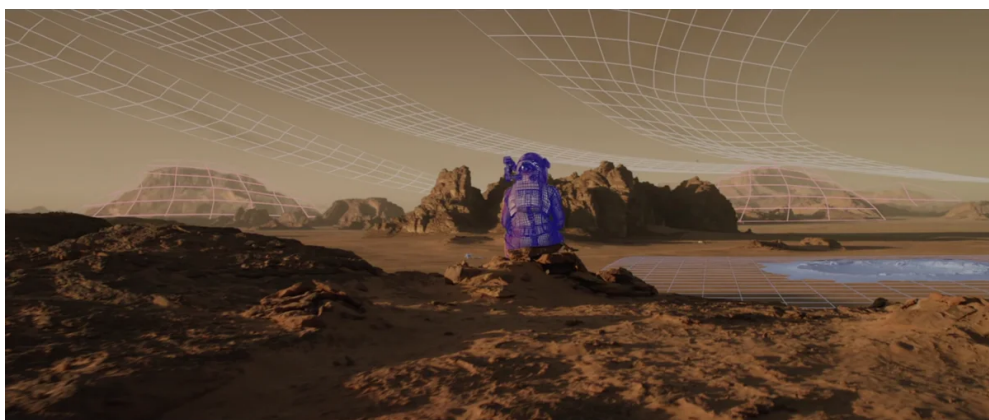
Usually, turning such a sky into a Martian sky would take a lot of time and resources - in each frame it was necessary to draw the sky along the contour of the mountains, cut it out and insert another. Instead, MPC has developed a special tool called "EarthToMars" (ETM) to quickly remove cyan directly in NUKE.

It should be added that the blue sky left reflexes on many objects and had to be fought with them too. The new tool, ETM, developed by MPC, has proven so good that the studio is now using it to remove parasitic reflexes when working with a green chroma key.

Here's an original shot in the desert.



On the computer, in the program "Newke" using the tool "EarthToMars", the blue sky is neutralized, clouds and craters are added.



In the final version, the frame looks like this - the frame now has a completely "Martian" sky:



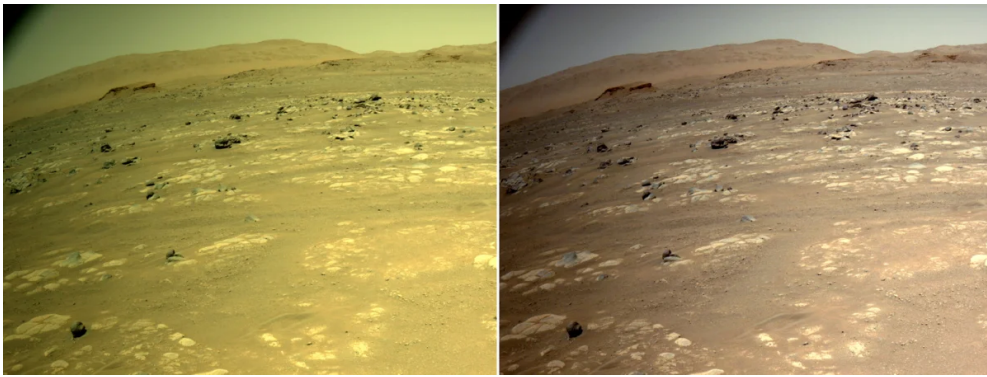
And something tells me that the same technologies were used at NASA to obtain frames from "real Mars". The rovers took their pictures on Earth in the desert, and then in two stages the picture turned into a "Martian" one. First, a special tool such as "EarthToMars" removed the color of the blue sky, and then the whole frame was brought to a brownish-orange tone. Here is a typical shot from the Curiosity rover, which, according to NASA, has been operating in temperatures that are tougher than Antarctica for 9 years. At night, the temperature on Mars drops to $-120 \text{ }^{\circ}\text{C}$ to $-140 \text{ }^{\circ}\text{C}$.



Curiosity on Mars.

Curiosity on Mars.

In the last mission to Mars, photos from Perseverance are tinted yellow-green. If we remove the excess color cast, then we will see an almost earthly sky. But it will not be as blue as we are used to seeing. It will be more gray.



Left - image from the Perseverance rover, taken from the NASA website. On the right - the excess yellow-green tint has been removed from the image.

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And then the fierce defenders of NASA begin to gleefully: "In the pictures of NASA, the sky is not at all like on Earth. So, it was actually filmed on Mars!"

But after all, we restored only one procedure in Photoshop - returned the tonality, removed the artificially introduced excessive color tone. But we cannot return the color of the sky, because at first the image went through the "EarthToMars" sky desaturation filter. And in Photoshop there is no tool for canceling this effect, there is no reverse procedure, such as "MarsToEarth".

And now we take a frame from the movie "The Martian" and remove the excess color tone through "automatic color correction".



A still from the movie "The Martian".

A still from the movie "The Martian".

The brownish tint of the entire frame fades and the sky appears gray.



After automatic color correction.

After automatic color correction.

If we take the images taken by the Perseverance rover and simply remove the excessive yellow-green tint in the graphics editor through “automatic color correction”, we will get an almost terrestrial landscape, but with a gray sky, where the blue color will only be guessed at.

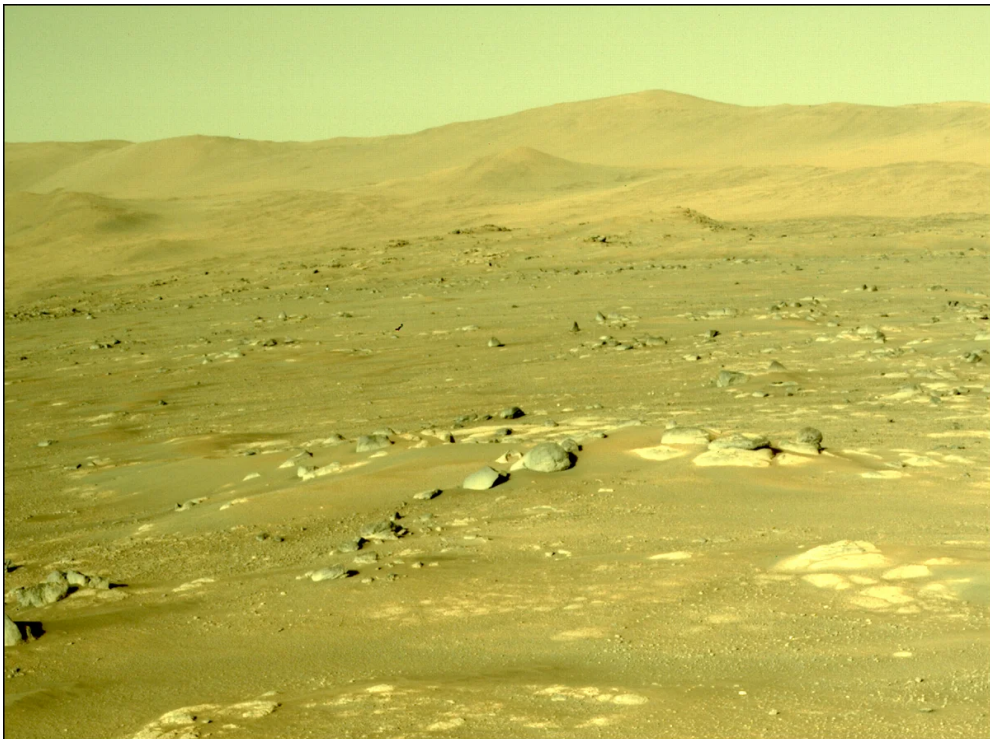
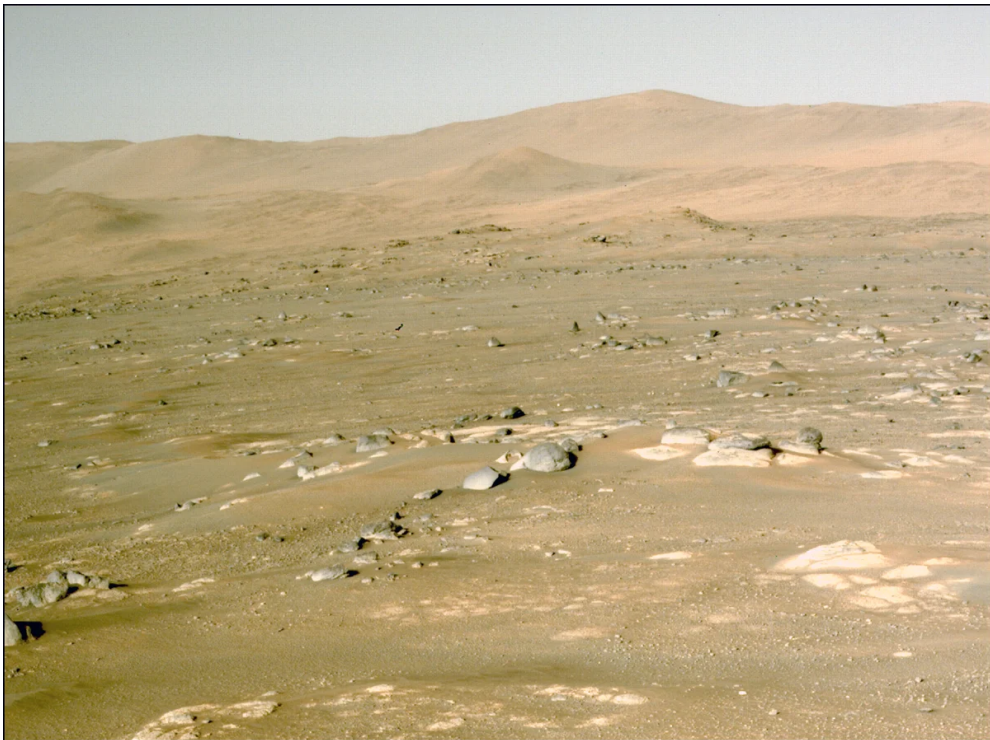


Image from the Perseverance rover on May 25, 2021. Taken from the official NASA website.

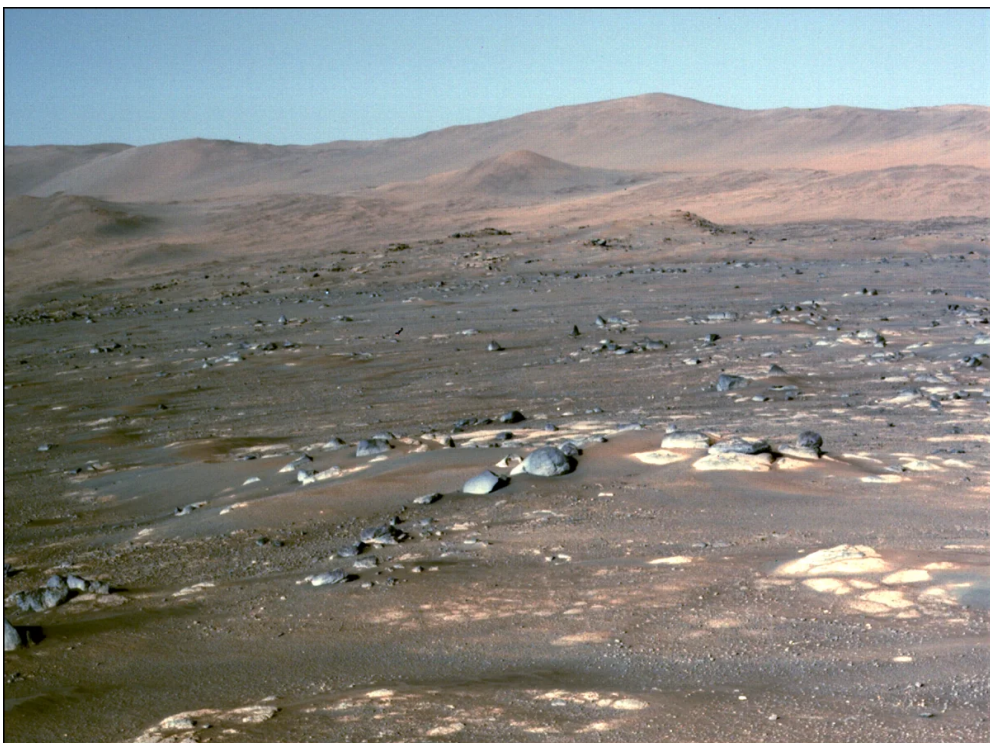
Image from the Perseverance rover on May 25, 2021. Taken from the official NASA website.



The same image after automatic color correction in Photoshop.

The same image after automatic color correction in Photoshop.

If you try to achieve the effect of a blue earthly sky through color correction, adding more blue, then shadows painted in the opposite color will appear in poorly lit areas. The dark edges of the stones will turn out to be dark blue.



Another option for automatic color correction in Pinta.

Another option for automatic color correction in Pinta.

What is the best option for color correction? To do this, on the body of the rover there is a color target with gray fields in the form of wide circles. We wrote about this calibration scale (color target) in detail in the previous article. [54. Does NASA show the real color of Mars if we know how the "Martian" camera works?](#)

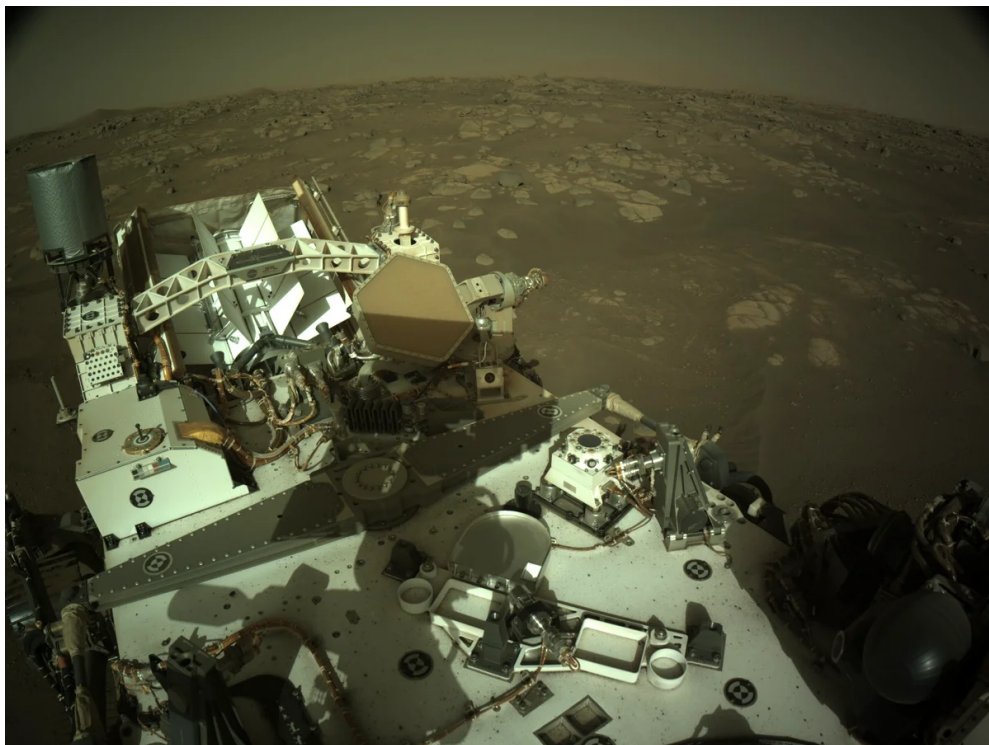
But here's what's interesting. When NASA shows this color target LARGE, the color correction appears to be nearly optimal.



Color target on the rover.

Color target on the rover.

The RGB values (89-91-82) for gray differ little from each other. And when we see the same scale on the GENERAL plan, then there the blue zone falls through. An eyedropper measurement in Photoshop shows that the RGB values have already changed noticeably: 91-96-65. The value for the blue zone has dropped sharply, there is not enough blue in the frame, the image has gone into a yellowish tint.



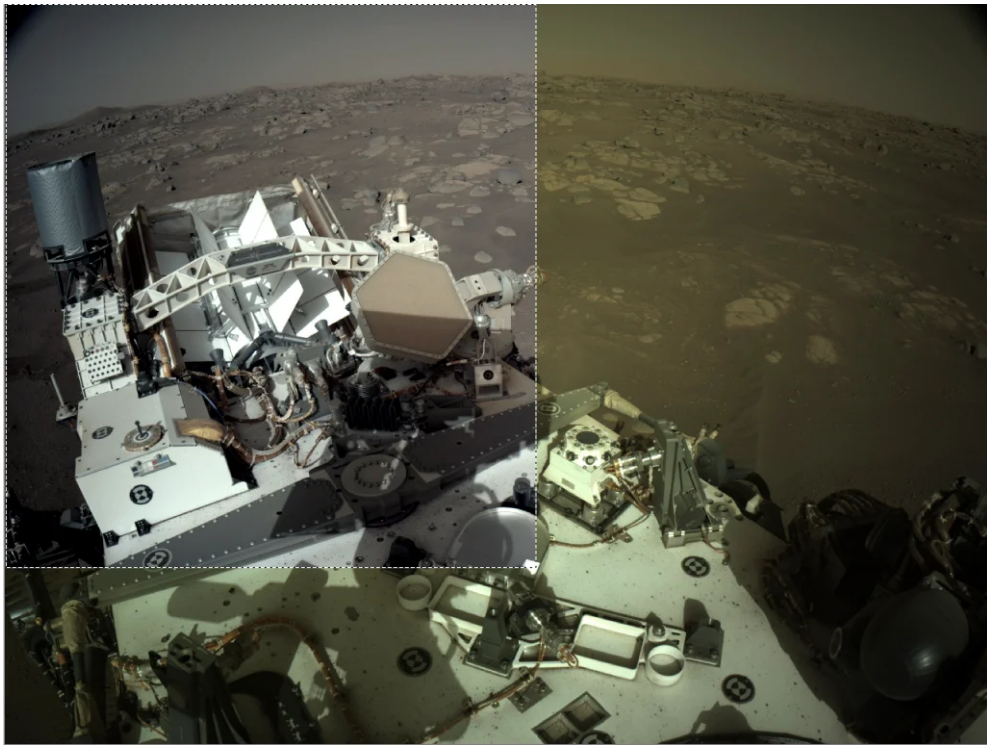
The color target is on the left side of the frame.

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If in the close-up the difference between the green and blue zones was 9 steps of brightness (in 8-bit format), then in the general shot this difference increased to 31.

I measured other shots taken on different days. The trend is clear - NASA is deceiving us. On close-ups, the color target is shown more or less correctly in color, and on general shots, the entire frame is taken away into obvious yellowness. And not even just in yellowness, but in some kind of swampy yellow-green color.

And here is what this image will look like if it is correctly corrected in gray scale. For ease of comparison, we adjusted only the upper left part of the frame, where the color target is, left the right part untouched.



Correctly color-corrected upper left of frame.

Correctly color-corrected upper left of frame.

From all that we have seen, a simple conclusion can be drawn.

The Perseverance rover, in our opinion, just like the Curiosity, takes pictures of the "Martian" surface on Earth, in a sparsely populated desert. Then in a graphics editor using a special tool such as ETM ("EarthToMars"), the bright blue sky in the image is discolored almost to a gray tone. And after that, the whole picture is taken to brown, orange or yellow-green tones.

Despite the fact that there is a color target with gray circles on the rover's hull, NASA does not pay attention to the accuracy of the shades of this calibration scale, and in general plans does deliberately incorrect color correction - it adds an excessive orange or yellow-green tint. And when he shows a color target large, he reproduces it more or less correctly in color, making it seem as though everything is in order with the colors in the "Martian images".

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Camerman L. Konovalov was with you. Until next time!

